

**Closeout Report**

on the

Director's Review

of

**BTeV's**

**Performance Management**

**System**

August 10-11, 2004

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## **Executive Summary**

A 2 day director's review of BTeV's performance management system was conducted on August 10-11. The committee assessed the BTeV PMS against the requirements set forth in DOE Manual 413.3-1 sections 12.4 and 12.7. The manual references ANSI / EIA Standard 748 on Earned Value Management Systems which lists 32 criteria for such systems to meet.

The committee heard presentations from members of the BTeV management and administration team and met with a few L2 managers.

Prior to the review BTeV presented preliminary copies of the following documents to the committee:

1. PEP – preliminary Project Execution Plan
2. PMP – preliminary Project Management Plan
3. PMSD – Project Management System Description
4. RMP – Draft BTeV Risk Management Plan
5. A chart containing the 32 ANSI criteria and BTeV's description of compliance for each

All this documentation is in rather complete form, patterned after other DOE projects' management documents and generally seems to satisfy the DOE requirements. These documents are being reviewed internally for consistency. Discussions with a few L2 managers indicated that they are familiar with the PMS documents including requirements for reporting and change control even now at this early stage of the project. The project showed results of a successful demonstration of schedule and budget reporting integration.

The committee judged that BTeV's plan for compliance with the criteria is acceptable. In discussions of the "32 criteria" chart there were suggestions for clarifications and some minor changes and additions. (See Appendix A)

FY05 will include both MIE and R&D. FY04 R&D costs are being collected and will be rolled into the BTeV plan early in FY05.

Additionally the committee was presented with:

- A Monthly Report template,
- An MOU (Memorandum of Understanding) template, and
- A Work List to prepare BTeV's PMS for CD2 including responsible people and target completion dates. (See Appendix B)

Much work remains, but there is much evidence that what is needed is understood and being achieved at an appropriate pace. While this is a work in progress it is quite far along. The committee feels that the project is on track for having an adequate project management system including change control and reporting in place for FY05.

## **1.0 Introduction**

A Director's Review of the BTeV's Performance Management System (PMS) was held on August 10-11, 2004. The Review Committee's assessment of BTeV's PMS is documented in the body of this report. As part of the Charge to the Review Team BTeV's PMS was assessed against the 32 Criteria in the EIA Standard EIA-748-A "Earned Value Management Systems" (EVMS). Appendix A lists the 32 Criteria, BTeV's description on how they comply with the criteria and the Review Team's assessment of BTeV's compliance to each of the 32 Criteria. As part of the review the Review Team requested BTeV Management to document a list of work the BTeV needs to accomplish to have their PMS ready for CD-2. A list was created by BTeV and suggestions from the Review Team were requested and added to the list shown in Appendix B. The Charge for this review is shown in Appendix C. An agenda is given in Appendix D. The members of the Review Committee and their assignments are listed in Appendix E and a list of Review Participants is given in Appendix F. Appendix G is a table that contains all the recommendations included in the body of this report. This table can be utilized by the project to track their response to the recommendations

## **2.0 Management**

### Findings

- The BTeV project scope is well understood and documented in a detailed WBS and schedule. Project management responsibilities are documented in the draft PMP.
- The BTeV project has defined and presented a change control process that takes in to account changes down to level 5. CR thresholds and required approvals have been defined for technical, schedule, and cost modifications.
- The CR system accounts both for non-directed and directed changes.
- The CR system is documented in the PEP and, PMP drafts and the PMSD. Responsibilities of individuals are clearly defined.

### Comments

- The responsibilities of the QA coordinator and the Integration Physicist are not documented in the draft PMP. The QA coordinator is described in the PMSD, with which the PMP should be made consistent.
- The CR system will capture upward cost changes and schedule delays, but may not always see cost decreases or schedule advances.
- The project office responsibility for expediting the requisition/acquisition process needs to be more clearly defined.
- BTeV may wish to consider possible optimization of the CR process as documented as information on its performance and manageability become available.

### Recommendations

1. The project should define a regular cost and schedule overview and update process, to be performed at least annually.
2. Verify consistency of all project management system documents.

### 3.0 Schedule

#### Findings

- The full baselined Open Plan schedule was not available at the time of the review. WBS elements 1.8 and 2.0 are undergoing revision, and other minor “tweaking” is still being done. The BTeV project consists of 13 Open Plan schedules with a Master Schedule that pulls all 13 subprojects together. The schedules have been resource leveled to meet the funding profile by year. The freeze date for the WBS and schedule is September 10.
- The scheduler’s methodology was sound, and he had the necessary background and was skilled in Open Plan.
- The project’s financial manager, while new appears to be matched to the position. Assistance while she gets up to speed is available from others at Fermilab.
- WBS Dictionary and BOE/Cost Books for WBS 1.2 and 1.3 from the CD-1 Review were briefly reviewed. The date for completing revisions to the WBS Dictionary and BOE is September 10.
- The schedule is resource loaded, but resource loading reports were not available at the time of the review.
- Schedule has to be leveled with earned value management in mind.

#### Comments

- The BOE/Cost Books have to be checked for completeness (e.g., do all procurements have a budgetary estimate, etc.). Statements on how labor estimates were determined have to be included (e.g., a statement such as: “same task was done on XYZ project and it took 10 hours”). The WBS Dictionary is sufficient.
- BTeV should address two methods of updating the monthly schedule status in the PMSD and in upcoming presentations. The preferred method of utilizing WelcomHome may not be in place when BTeV needs to start statusing progress on their schedules, so the alternate manual method should be identified and documented.
- Assure procurement schedule activities are appropriately structured to allow the project to establish obligation profiles and cost profiles for earned value.
- Resource loading in Open Plan and Cobra should track against cost book.

#### Recommendations

1. Freeze the WBS and schedule on September 10 and implement the change control process for any subsequent changes. This will help minimize inconsistencies between Open Plan and Cobra during the Cobra implementation.
2. Train project’s financial manager so she gets up to speed quickly.

3. The Labor Resource Leveling should be performed on the entire BTeV Open Plan schedule to better establish when the work not on the critical path will be performed based on availability of personnel. This will establish the appropriate schedule dates, which will be used for the schedule baseline and loaded into Cobra.
4. As part of analyzing the monthly status updates to the schedule, a float analysis should be performed on key milestones and high-risk activities as an additional tool in the Performance Management System. The process for performing and reporting the float analysis should be established and then included in the PMSD.

## 4.0 Earned Value

### Coupling to Schedule

#### Findings

- The project administration team successfully demonstrated that data from the Open Plan schedule can be successfully loaded into the Cobra software program. One cycle of updating schedule status was shown.
- The project intends to rely primarily on the use of the percent complete method for determining earned value.

#### Comments

- Work still needs to be done to re-align the current obligation budget profile for materials and services purchases to a cost profile that can be used for accurate earned value reporting calculation.
- The percent complete PMT method tends to yield less objective results than some of the other methods.

#### Recommendations

1. Document the process that will be used to adapt the obligation budget profile to a cost budget profile then test and apply that process. Verify that the results are reasonable.
2. Review and re-evaluate the PMT assignments and select a more objective method where appropriate.

### Coupling to Laboratory Accounting System

#### Finding:

- The project administration team successfully demonstrated the entry of sample actual cost data into the Cobra software.

#### Comments:

- The entry of sample actual cost data is an excellent milestone to have achieved. It demonstrates that the mechanical functionality of the software will work as required. However, the correct construction of the project structure in the Laboratory Accounting System for R&D costs to assure accurate cost tracking across the laboratory at the cost account level must still be determined. Since it is the plan of the project for the reporting of these costs to begin early in FY05, it is very important that the decision on this issue is made quickly and the requirements to the divisions be communicated as soon as possible after that



decision has been made. There will also be costs external to the accounting system for in-kind contributions that will need to be entered in to Cobra for correct calculation of ACWP and cost variance.

Recommendations:

3. Decide on a project structure for reporting R&D costs across the laboratory and implement that structure in the Laboratory Accounting System early in FY05.
4. Establish and document a process for entering in-kind contribution costs into Cobra.

## **5.0 Answer to Questions in DOE Draft Charge plus does the BTeV PMS meet the 32 criteria of ANSI / EIA-748-A?**

### ***5.1 Is the system software and hardware operating adequately, and have appropriate reports been generated using the system with real project data?***

The results of a trial exercise designed to demonstrate the electronic integration of project data between Open Plan, Oracle Project Accounting and Cobra were reviewed. This trial exercise utilized actual cost estimate data from the resource loaded Open Plan schedule and simulated data for earned value and actual costs. It was necessary to simulate the earned value and actual cost data because the project does not have MIE funding available to spend until FY05. A single EV report – a CPR Format 1 – was generated from Cobra for this review however, it was stated that the capability to produce a full suite of reports exists. Further, it was stated that a suite of reports similar to what the NuMI Project prepares will form the basis of the monthly report suite for the BTeV Project.

It appears that the software and hardware is operating adequately and occurs electronically without significant outside manipulation. While we were not able to examine a full suite of reports we did not see anything to indicate that this cannot be achieved with the existing data structure as defined in Open Plan and Cobra. A review of the data structures indicates that they likely have the ability to produce the standard required reports as well as to respond to a wide variety of ad hoc reporting requests.

### ***5.2 Is the system adequately documented?***

Documentation for the earned value management system as it relates to what will actually be done is not well documented. Also, consistency between the documents has to be verified. In some cases, the current documents, most notably the PMSD, are not consistent with current Fermilab policies and procedures.

Identify and document the following processes:

- Generating earned value data based on late dates for submittal to DOE for PARS.
- Collecting monthly status, progress reports, and variance analyses.
- Generating the monthly report.
- Change control.

***5.3 Will the system produce timely and accurate reports in a readable and meaningful format?***

Yes. Project management has agreed upon the use of the NuMI monthly reports as a template for their reporting. These reports have proved useful in communicating necessary information to all relevant stakeholders. In addition, the project has assigned reporting staff that are very knowledgeable in the area of accounting validation.

A simulated earned value report based on allowing the schedule to update one month for selected items has been generated and validated.

The project is encouraged to maintain attention on verifying the accuracy of data integration among the scheduling, accounting and reporting tools. Target dates for report preparation should be documented.

***5.4 Is the system flexible enough to adapt to changes without extensive modification?***

Yes. The Open Plan, Cobra and Oracle PA software products are all flexible enough to accommodate any changes that may arise from the change control process. There are some restrictions as to how changes to activities in progress can be implemented, particularly if costs have already been recorded, but they do not prevent changes from being made. The Change Control process is well documented to manage changes.

***5.5 Will the system satisfy Fermilab's and DOE's information needs?***

Yes. The Project Control System and Reporting are very similar to what is currently being used by the NuMI project. The information from the NuMI system is being successfully used by Fermilab and DOE.

***5.6 Are personnel adequately knowledgeable to operate the system and use the information?***

Presentations and discussions with the project management, project administration and a few L2 managers indicate that the team is well coordinated and understands their roles and responsibilities.

There has been training among all the users of the system.

The project has produced trial financial reports from Cobra.

The project will produce an August monthly report in September.

There is a new fulltime PBO who is well-qualified, understands the project control and reporting needs, and is rapidly integrating into the BTeV Project.

***5.7 Does the BTeV PMS meet the 32 criteria of ANSI / EIA-748-A?***

Short answer is, yes for the MIE portion of the BTeV effort. Longer answer: BTeV plans to implement the system for the Other Project Cost (OPC) portion of the project which includes R&D and Spares early in FY 2005. Since application of the PMS has not yet begun, some group independent from the BTeV project should review how the system is working some six months or so into FY05.

BTeV provided a table describing how they meet each of the 32 criteria. This Review Committee has annotated this table included in this report as Appendix A. Some committee comments of particular note include comments on criteria 3-1, 4-2, and 5-5.

#### Recommendations from Answering the Questions

1. Update the Earned Value Management System document (PMSD) to more accurately reflect how project management processes will be executed and verify that the content is consistent with other BTeV documents and Fermilab policies and procedures. Some of the processes that should be addressed in this update are: Generating earned value data based on late dates for submittal to DOE for PARS; Collecting monthly status, progress reports, and variance analyses; Generating the monthly report and Change control. (Question 5.2)
2. Since application of the PMS has not yet begun, some group independent from the BTeV project should review how the system is working some six months or so into FY05. (Question 5.7)

## Appendix A

### Earned Value Management Systems 32 Criteria

#### Category 1: Organization

Number	Criteria Description	Description on how BTeV complies with the criteria	Reviewers Comments
1-1	Define the authorized work elements for the program. A work breakdown structure, tailored for effective internal management control, is commonly used in this process.	1) Uses Welcom OpenPlan project planning software to generate WBS structure. The WBS is defined to appropriate levels for all subprojects, typically to between levels 5-7. 2) PPEP Section 5 describes the WBS to Level 2	OK. The WBS is well developed.
1-2	Identify the program organizational structure, including the major subcontractors responsible for accomplishing the authorized work, and define the organizational elements in which work will be planned and controlled.	1) PPEP Section 5 describes the OBS to Level 2. The WBS and OBS from Level 1 down are very similar. WBS 1.0 is not part of the OBS, but that is the only significant difference. 2) The relation between the OBS and WBS is further defined in PPMP Section 3 by the addition of additional advisory groups. 3) The Collaborating universities are major subcontractors in the Project. Universities or INFN are the lead institution for four of the Level 2 projects, which are led and staffed by collaborators from those universities. The MOU and SOW process for the universities and FNAL will specify the authorized work; the organizational structure and detail all required reporting and accounting practices required.	OK. Regarding organization responsibilities BTeV has a Responsibility Matrix for Fermilab Divisions and Sections and a Table of Laboratory and University participants working on each WBS Level 2 item.
1-3	Provide for the integration of the company's planning, scheduling, budgeting, work authorization and cost accumulation processes with each other, and as appropriate, the program work breakdown structure and the program organizational structure.	1) PMSD Section 3.6 describes the use of Welcom OpenPlan and Welcom Cobra to do integrated cost and schedule management. 2) PMSD Section 4.5 describes the work packages created from the Project schedule, their outline, and how they are authorized.	OK. These items are well integrated.

1-4	Identify the company organization or function responsible for controlling overhead (indirect costs).	1) PMSD Appendix B describes the overhead policy at FNAL in general, for large procurements, and for pass through funding. 2) Allowable indirect costs at universities will be specified and agreed to in MOU's between the universities and FNAL.	The Laboratory Directorate is responsible for controlling overhead.
1-5	Provide for integration of the program work breakdown structure and the program organizational structure in a manner that permits cost and schedule performance measurement by elements of either or both structures as needed.	1) PPEP Section 5 describes the WBS and OBS to Level 2. 2) PMSD Section 3 states that both Open Plan and Cobra are based on the WBS. Using Cobra it is possible to extract budget information based on WBS or institution or both.	OK. The implementation of the BTeV PMS using the Open Plan and Cobra tools allows for performance measurement by either or both WBS and/or organizational structure.

## Category 2: Planning and Budgeting

Number	Criteria Description	Description on how BTeV complies with the criteria	Reviewers Comments
2-1	Schedule the authorized work in a manner which describes the sequence of work and identifies significant task interdependencies required to meet the requirements of the program.	1) PMSD Section 3.4 describes steps used create the schedule in OpenPlan, from identifying all work to be done, to resource leveling, identifying significant task interdependencies, and integration into Cobra. . 2) Most interdependency issues reside in WBS 1.10, I&I, whose major task is their resolution.	Section 3.4 is scheduled to be revised by August 20. It will describe development of the resource-loaded, logically driven schedule.
2-2	Identify physical products, milestones, technical performance goals, or other indicators that will be used to measure progress.	1) PPEP Section 7.4 Identifies the Tier 0 and 1 milestones agreed upon by the DOE, FNAL management, and the BTeV Project. 2) PPMP Section 6.2.2 identifies, in addition to the Tier 0 and 1 milestones, the Tier 2 and 3 Milestones. The Tier 4 and 5 milestones are owned by the project, and defined by the WBS managers.	Add reference to PMSD Section 4.2 that describes EV Planning and Measurement.
2-3	Establish and maintain a time-phased budget baseline, at the control account level, against which program performance can be measured. Budget for far-term efforts may be held in higher level accounts until an appropriate time for allocation at the control account level. Initial budgets established for performance measurement will be based on either internal management goals or the external customer negotiated target cost, including estimates for authorized but undefinitized work. On government contracts, if an over-target baseline is used for performance measurement reporting purposes, prior notification must be provided to the customer.	1) PMSD Section 3.4 describes the development of the resource-loaded, resource leveled schedule. 2) The higher level “planning package” budge allocation method is not used at FNAL. We plan everything in detail at the outset for the duration of the project. 3) The Project Schedule Officer is responsible for maintaining the detailed schedule baseline in Welcom OpenPlan, and the Project Budget Officer is responsible for maintaining the cost estimate in Welcom Cobra.	See comment in 2-1. for 1).  Add reference to PMSD, Section 3.2, The Base Cost Estimate. This states that the cost estimate is used to establish the cost baseline.  Item 2 could be omitted since the criteria description only says, “....may be held in higher level accounts...”. Stating that this option is not exercised doesn't support compliance either way. And besides it may eventually be something to consider, at least on the Cobra side. Why not leave the door open?

2-4	Establish budgets for authorized work with identification of significant cost elements (labor, material, etc.) as needed for internal management and for control of subcontractors.	<p>1) PMSD Section 3.2 describes the Base Cost development by the WBS managers.</p> <p>2) PMSD Section 3.3 describes escalation rates</p> <p>3) PPMP Section 6.4 describes the contingency calculation process</p>	<p>Add at the end of 1): “and states that the estimate consists of the cost of items/services to be purchased plus an estimate of the labor effort (time, type, and cost) for work planned by Fermilab and personnel at universities and other national laboratories.”</p> <p>Be clear when referencing contingency that it is understood it is not part of the cost baseline.</p> <p>However, since contingency is not part of the performance measurement baseline it might be more appropriate to eliminate any reference to it here.</p>
2-5	To the extent it is practical to identify the authorized work in discrete work packages, establish budgets for this work in terms of dollars, hours, or other measurable units. Where the entire control account is not subdivided into work packages, identify the far term effort in larger planning packages for budget and scheduling purposes.	<p>1) Resource loaded schedule in Open Plan used to describe all work in project down to lowest level. All efforts can be rolled up to any level desired. Information from Open Plan is imported into Cobra.</p> <p>2) All Cost Accounts are made up from Work Packages.</p>	Understand definition of “work package” given in EIA Standard. If there is a chart of accounts that relates a charge code to a WBS element, this could be referenced.
2-6	Provide that the sum of all work package <u>budgets</u> plus planning package <u>budgets</u> within a control account equals the control account budget.	1) PSMD Section 4.5 states that the sum of the <u>actual costs</u> for the work packages completed and the funding authorized to all open work packages cannot exceed the cumulative budget for the BTeV Project. The project accounting tools will ensure this.	<p>The CPR provides verification that roll-up of work package budget equals control account budget.</p> <p>Reference to actual costs and authorized funding can be eliminated. The criteria addresses only budgets.</p>



2-7	Identify and control level of effort activity by time-phased budgets established for this purpose. Only that effort which is immeasurable or for which measurement is impractical may be classified as level of effort.	1) PMSD Section 4.3 describes when the LOE method may be used.	OK
2-8	Establish overhead budgets for each significant organizational component of the company for expenses which will become indirect costs. Reflect in the program budgets, at the appropriate level, the amounts in overhead pools that are planned to be allocated to the program as indirect costs.	1) PMSD Appendix B describes the FINAL overhead policies as they apply to Projects. 2) Overhead is applied to Cobra to generate the project cost.	OK
2-9	Identify management reserves and undistributed budget.	1) The baseline does not include a management reserve but does have project contingency. 2) The baseline does not have any undistributed budget.	Suggest leaving off reference to project contingency. Or, another way to respond would be to say that the Cobra software includes all the necessary functionality to track and account for management reserves, undistributed budget and contingency, if any exists.
2-10	Provide that the program target cost goal is reconciled with the sum of all internal program budgets and management reserves.	1) The CPR will provide monthly verification of actual and budgeted costs for the life of the project.	Leave out reference to actual costs.

### Category 3: Accounting Considerations

Number	Criteria Description	Description on how BTeV complies with the criteria	Reviewers Comments
3-1	Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account.	1) Financial data accumulation and costing will be done using the FNAL standard financial systems. 2) PSMD Section 5.2 describes how actual costs for labor, vendor invoices and overhead are entered into the accounting system.	PSMD Section 5.2 Paragraph 2 should be modified to reflect business practices at Fermilab. Since our practice is to accrue the cost of work performed and services received upon receipt all reference to the alternative approach of delaying the recognition of earned value until an invoice is received should be deleted. Also, we do not have any established threshold below which an accrual is not required. At minimum, Accounting expects that reasonable attempts will be made to identify and accrue ALL costs for services and/or materials received during the fiscal year at fiscal year end. For major projects such as BTeV it is also desirable that this be done at the close of each month. However, in this case setting a threshold – provided it is low enough - may be acceptable.

3-2	When a work breakdown structure is used, summarize direct costs from control accounts into the work breakdown structure without allocation of a single control account to two or more work breakdown structure elements.	<p>1) Work packages will be opened at the lowest WBS levels, and are used to specify deliverables. Cost accounts are used by project participants to charge time and other allowable charges to a project. The Cost Account usually comprises work packages and is the lowest summation level in the Work Breakdown Structure.</p> <p>2) BTeV has not set the cost account level to a uniform WBS level – we generated the cost accounts at the level where they made sense, but that is different for different parts of projects.</p>	We are in compliance with this requirement however that isn't necessarily clear as the response is currently written. All that really needs to be said about this is that there is a one to one relationship between Oracle PA tasks and Cobra control accounts.
3-3	Summarize direct costs from the control accounts into the contractor's organizational elements without allocation of a single control account to two or more organizational elements.	1) Actual costs are imported into Welcom Cobra directly from the lab financial system every month, as described in the PMSD, section 3.6. Cobra can summarize this data down to the Cost Account level.	Again, we're in compliance but the description doesn't clearly reflect that. The fact that we have established a one to one relationship between Oracle PA tasks and Cobra control accounts and have only a single "task owning" organization demonstrates our compliance.
3-4	Record all indirect costs which will be allocated to the contract.	<p>1) The standard FNAL Oracle based accounting system tracks all overhead costs applied to the project and reports them to the project on a monthly basis. The basis by which the lab applies overheads is described in the PMSD, Appendix B.</p> <p>2) For contracts to universities, the standard invoices from them must contain the university overhead that has been included in the invoice and as specified in the MOU and SOW between them and FNAL.</p>	Indirect costs are allocated to the contract and recorded in Oracle PA at the close of each month in accordance with Fermilab's established business practices. They will be uploaded into Cobra at the same time, and in the same manner, as direct costs to the project.

3-5	Identify unit costs, equivalent units costs, or lot costs when needed.	The schedule baseline prepared in Welcom OpenPlan calculates labor in hours for university and lab personnel and calculates costs based on hourly rates for different job classifications. For purchases of materials, the standard procurement procedure is to specify a total cost based on unit cost. To compare actual and planned unit costs, the standard monthly cost reports prepared using the lab's financial system are provided to the project office for review.	Since the last sentence of this explanation is really extraneous to the criteria it should be removed.
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3-6	<p>For EVMS, the material accounting system will provide for</p> <ul style="list-style-type: none"> <li>— accurate cost accumulation and assignment of costs to control accounts in a manner consistent with the budgets using recognized, acceptable, costing techniques;</li> <li>— cost performance measurement at the point in time most suitable for the category of material involved, but no earlier than the time of progress payments or actual receipt of material; and</li> <li>— Full accountability of all material purchased for the program including the residual inventory.</li> </ul>	<p>1) Costs of materials purchased are accrued in the lab financial system when the materials have been received and recorded by the lab receiving department.</p> <p>2) Costs of materials purchased through subcontract awards (typically through universities) will also only be accrued after receipt and recording of goods by the subcontractor.</p> <p>3) Service requests to FNAL support organizations are also use to procure materials. Those costs are accrued using Cost Accounts, which have a direct and well defined relationship to the WBS on a monthly basis using the lab financial service.</p> <p>4) Costs must be incurred or accrued through the FNAL accounting system before value can be earned.</p> <p>5) Equipment purchased by the BTeV Project using DOE funds will become the property of FNAL. All electronics material purchased, including commercial switches, processors, electronics crates and circuit boards will be entered into and tracked using the Computing Divisions equipment database. All hardware components will be under the supervision and control of the BTeV Project, until it is superceded by the BTeV Operations Department.</p>	<p>The wording could be a bit more concise to eliminate information extraneous to the criteria:</p> <p>1) The cost of materials purchased is accrued at the time the receipt is recorded.</p> <p>2) The cost of services received but not invoiced are accrued at each month-end on the basis of either sound estimates provided by appropriate project personnel or unrecorded invoices that have been first validated by appropriate project personnel</p> <p>3) Miscellaneous in-house charges such as those for duplicating services, photography and such are recorded by cost transfer at month-end.</p> <p>4) The details of materials acquisitions that are to be held in inventory pending assembly and/or installation will be recorded in the Computing Division equipment database. They will be under the supervision and control of the BTeV Project until it is superceded by the BTeV Operations Department.</p> <p>Note, your item number four should be eliminated since it does not reflect our current business practices. See comments for 3-1 above.</p>
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#### Category 4: Analysis and Management Reports

Number	Criteria Description	Description on how BTeV complies with the criteria	Reviewers Comments
4-1	<p>At least on a monthly basis, generate the following information at the control account and other levels as necessary for management control using actual cost data from, or reconcilable with, the accounting system.</p> <ul style="list-style-type: none"> <li>— Comparison of the amount of planned budget and the amount of budget earned for work accomplished. This comparison provides the schedule variance.</li> <li>— Comparison of the amount of the budget earned the actual (applied where appropriate) direct costs for the same work. This comparison provides the cost variance.</li> </ul>	<p>1) Welcom Cobra will be used to produce monthly, standard, EVMS reports and graphs that will present both cumulative and monthly BCWS, BCWP, ACWP, variances, and other information as needed. The data will be used by the project office to determine project status and determine corrective action when needed, and will be given to all Level 2 managers for use in measuring subproject status.</p>	OK.
4-2	<p>Identify, at least monthly, the significant differences between both planned and actual schedule performance and planned and actual cost performance, and provide the reasons for the variances in the detail needed by program management.</p>	<p>1) Monthly reports with variances between both planned and actual schedule performance and planned and actual cost performance, will be generated by the project office, as described in the PMSD, Section 5.</p> <p>2) In cases where both the dollar threshold and the CPI/SPI limits are exceeded, written variance reports are required. It is the responsibility of the appropriate WBS manager to provide the required variance reports to the Project Manager, and to develop and implement corrective action plans, if needed.</p> <p>3) The variance analysis section of the monthly report to DOE contains the BTeV Project Manager's summary of the significant variances, their causes, their likely impacts, and a description of corrective action(s) taken or planned. Significant cost variances likely to be sustained will be reflected in the EAC.</p>	OK. Develop the specific report to be provided for PARS.

4-3	Identify budgeted and applied (or actual) indirect costs at the level and frequency needed by management for effective control, along with the reasons for any significant variances.	<p>1) Planned and Actual indirect costs will be reported in the monthly CPR prepared by the BTeV Budget Officer. This information will be given to the Project Manager and the Level 2 managers. OK.</p> <p>2) Because the indirect rates are fixed by the lab, there should be no rate variances. Any cost variances should be the result of cost variance in the procured material or labor. Cost variances in excess of the thresholds specified in the PMP, Section 7.4, will be reported and corrected as appropriate.</p>	OK as modified during the discussions with BTeV management
4-4	Summarize the data elements and associated variances through the program organization and/or work breakdown structure to support management needs and any customer reporting specified in the contract.	<p>1) Welcom Cobra will be used by the BTeV Budget Officer to produce monthly, standard, EVMS reports and graphs that will present both cumulative and monthly BCWS, BCWP, ACWP, variances, and other information as needed.</p> <p>2) These monthly reports with both planned and actual schedule performance and planned and actual cost performance and variances, will be distributed to the project manager and all Level 2 managers.</p> <p>3) The report described above will be used as the basis of the monthly report submitted to the Department of Energy. In addition to the financial data, the report, generated by the Project Manager, will contain a summary of the variances, their cost and schedule impact, their causes and a description of the corrective action needed.</p>	OK as modified during discussions.
4-5	Implement managerial actions taken as the result of earned value information.	<p>1) The Technical board meeting following the production of the monthly CPR will be devoted to reports and discussion of all cost and schedule variances, as described in the PMSD, Section 5.5. Plans for needed corrective action will be developed in the Level 2 managers weekly meetings and presented to the Technical Board for discussion and approval by the PM. It is the Level 2 managers responsibility to understand, monitor, and report on the corrective actions to the Technical Board until the variance is resolved.</p>	OK.

4.6	Develop revised estimates of cost at completion based on performance to date, commitment values for material, and estimates of future conditions. Compare this information with the performance measurement baseline to identify variances at completion important to company management and any applicable customer reporting requirements including statements of funding requirements.	<p>1) Each month, Cobra projects and reports the EAC as the sum of the actual costs to date plus the current BCWS for remaining work.</p> <p>2) A comprehensive “bottoms-up” reevaluation of ETC may be initiated at any time at the discretion of a WBS manager (for his/her system), of BTeV Management, or of DOE. The method used to prepare this estimate is the same as was used to prepare the original base estimate.</p> <p>3) As described in the PMSD, Section 4.7, it is expected that the BTeV Project will make such estimates prior to annual or semi-annual DOE reviews.</p>	<p>OK.</p> <p>It may be safer to say in number 1 that the Cobra software includes various automated methods for calculating an EAC that can be used for monthly reporting and variance analysis instead of committing to one method prior to evaluating which method will best fit BTeV.</p>
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## Category 5: Revisions and Data Maintenance

Number	Criteria Description	Description on how BTeV complies with the criteria	Reviewers Comments
5-1	Incorporate authorized changes in a timely manner, recording the effects of such changes in budgets and schedules. In the directed effort prior to negotiation of a change, base such revisions on the amount estimated and budgeted to the program organizations.	<p>1) After a PCR is approved at the appropriate level, as described in the PMSD, Section 10.2, including directed changes, the Project Manager is responsible for the administrative operation and coordination of the overall baseline change control system in support of all BTeV Project participants.</p> <p>2) Upon approval of the PCR, the baselines will be modified to reflect the scope, cost, and schedule impacts of the directed change.</p> <p>3) For directed changes by the DOE, where the real impact may not be known for some time, estimated amounts will be used in planning and management.</p>	No comment
5-2	Reconcile current budgets to prior budgets in terms of changes to the authorized work and internal replanning in the detail needed by management for effective control.	<p>1) The TCSSA form, shown in the PMSD, Appendix A, which accompanies the PCR, is used to evaluate the cost and schedule impact of the proposed change.</p> <p>2) The Level 2 manager of the affected subproject will make the initial review of the PCR and TCSSA and provide an analysis of the differences between the baseline work packages, cost and schedule, and the proposed new ones.</p>	Overall update of the schedule and cost estimates should be done prior to reviews. As these occur approximately every 6 months, this will provide an opportunity for reconciliation and replanning at least twice a year.
5-3	Control retroactive changes to records pertaining to work performed that would change previously reported amounts for actual costs, earned value, or budgets. Adjustments should be made only for correction of errors, routine accounting adjustments, effects of customer or management directed changes, or to improve the baseline integrity and accuracy of performance measurement data.	1) Retroactive changes to records will be limited to correction of errors. In general, baseline changes are only able to change future work, and are not allowed to retroactively change previously reported EV calculations.	A functionality of the Cobra reporting tool will be used that prevents retroactive changes to records.

5-4	Prevent revisions to the program budget except for authorized changes.	<p>1) PCR's must be documented, reviewed, and approved at the appropriate levels before the baseline will be modified at any level, as described in the PSMD, Section 2.</p> <p>2) Only when the PCR is approved by the appropriate level change official does it becomes a Change Order and is transmitted to the Project Manager. The PM will update the Change Log, ensure the baselines are modified appropriately, and communicate the action to all affected project participants.</p>	<p>Access to both the Open Plan and Cobra software programs are controlled through server and software password requirements. Only the personnel that will be authorized to make these changes will have access to these programs. They have been charged with making only those changes that have been communicated to them by the PM.</p>
5-5	Document changes to the performance measurement baseline.	<p>1) Each PCR is assigned a unique identifier, and after approval, a change log entry tied to that identifier is made. The PCR identifies each affected WBS task in the baseline, and each of those tasks will receive a revision number, as described in the PMSD, section 10.2.</p> <p>2) The PCR's and TCSSA's will be stored electronically and in hard copy for the duration of the project using the BTeV document database.</p> <p>3) Each baseline file is archived for the duration of the project.</p>	<p>Through the Cobra software it is possible to track entry of PCRs. This functionality should be used.</p>

**Appendix B****Performance Management Worklist for CD-2**

Number	Task	People, schedule, details
1	Cross check PPEP, PPMP, PMSD, AS for consistency	Joel, Mike, Dep. Director, Ron L. Done by Sept. 10
2	Upgrade section 3.4 Steps 1-3 in PMSD to make the description of Open Plan and Cobra uploading, integration and organization reflect what will actually happen Talk about transition from Open Plan updating to WelcomHome Perhaps break into two sections, one for initial generation of baseline, and a second that details project procedures for use in the duration of the project.	Bill, Mike, Ellie, Suzanne, Connee, Ed B. Done by Aug. 20
3	Create a plan for generating the baseline WBS for the CD-2 review	Mike, Joel, Sheldon, Dep. Director Schedule contingency distribution rules for WBS level 2 managers Include Resource leveling instructions, concentrate on big/long duration items Done by Aug. 16
4	Update Open Plan schedules under 3) and revise and update the WBS dictionary and BOE	All L2 Managers, Bill, Ed, Bob Develop appropriate WBS structure for R&D activities. Finish by Sept. 10 Freeze at that point

Number	Task	People, schedule, details
5	Define funding arrangements for university led efforts. That is, write down the MOU, SOW, and reporting requirements in the PMSD that we want to follow Create monthly university reporting forms	Joel, Sheldon, Suzanne, Connee, Dep. Director Done by Sept. 15 Anne N., Sherry L. (CMS) can provide worksheet templates from their projects
6	Better define in PMSD how you carry variances and when they need to become PCR's	Mike, Joel, Suzanne Done by Sept. 1
7	Rewrite change control thresholds	Mike, Joel, Dep. Director L3 Cost thresholds "All" cost changes vs. increases - resolve Cumulative increases, ex. -10% over 12 months – resolve monitoring/tracking procedure
8	Determine reporting requirements for BTeV FY2004 expenditures	Connee, Ellie, Ron Lutha, Mike and Joel Have plan before Temple review – Lutha approval
9	Generate Monthly report for August (no CPR)	Mike, Joel, L2 managers, Bill, Suzanne Last week in Sept. Perhaps insert fake CPR (labeled as such)
10	Define WelcomHome implementation schedule	Ed Barsotti, Dean Hoffer In Development machine by mid-Sept. Would like to have implemented in project by 2 <sup>nd</sup> quarter of FY2005
11	Shift funds from obligation profile to value earned profile in Open Plan and upload to Cobra as second baseline	Suzanne, Bill, Ellie
12	Carry L4 and L3 PCR for 1.8 and 2.0 through to baseline Change	Mike, Erik G., Mike C., Joel, PMG Sept. 1

Number	Task	People, schedule, details
13	Complete document database development for automated PCR processing	Mike, Joel, Eric V. Sept. 1
14	Update 32 EVMS criteria	Mike, Joel Aug. 16
15	Put all BTeV controlled documents that need signoff, such as the PMSD, under the document signoff and control system (should be ready to go ASAP)	Mike, Joel, Eric V., Penny Kasper Sept. 1
16	Accruals – Specify how they are done	Suzanne, Ellie Aug. 20
17	Understand all PARS reporting requirements	Paul P., Mike, Suzanne, Joel Document in PMSD Talk to Ken Domann - base on DOE milestone dates for BCWS Sept. 1

## **Appendix C**

### **Draft Charge for the Fermilab Internal Review of the BTev Performance Management System**

#### **Background**

It is desirable to have the BTeV Performance Management System (PMS) sufficiently developed at the time of the Lehman DOE CD-2/3a Review tentatively scheduled for October 26-28, 2004. The plan is to conduct an Internal PMS Review on August 10-11 and a DOE BTeV PMS Review chartered by the DOE BTeV Project Director in early October. BTeV plans to have the PMS documented and working in a test mode on three or four Level 2 WBS elements by the time of the Internal Review. They plan to have the system documentation and the PMS working in test mode on all the MIE funded activities at the time of the DOE PMS Review. Application of the PMS to R&D activities had not been planned, but the DOE requires application to the Total Project Cost (TPC), including Other Project Costs (OPC). The OPC include R&D funded activities. BTeV plans to launch the application of PMS to the R&D funded efforts early in FY05 and retrofit as required to cover all of FY05 (and FY04 if required).

This Internal PMS Review will be a review of work in progress. It is intended to provide constructive comments and advice to the BTeV project team as they develop the PMS further.

A draft charge (attached) was prepared for the DOE PMS Review by the DOE Project Director.

#### **Charge**

Please assess compliance of the BTeV Project Management System against the requirements set forth in the DOE Manual 413.3-1 sections 12.4 and 12.7 (copies attached). The manual references the ANSI/EIA 748 Earned Value Management System criteria as the standard for DOE PMSs. So, please assess the BTeV PMS against the ANSI/EIA 748 standard.

Furthermore, to the extent possible, assess the BTeV PMS against the draft DOE PMS Review charge.

Please provide findings, comments, and recommendations to the BTeV project management team and Fermilab management at a closeout review on August 11 and provide a written report soon thereafter.

## Appendix D

### Internal Fermilab BTeV Performance Management System Review August 10-11, 2004 Agenda

Tuesday, August 10, 2004 – Hornet's Nest 8N Crossover

8:30 AM	Committee Executive Session	G. Bock, Chair E. Temple
9:00 AM	Welcome & Introduction	K. Stanfield
9:10 AM	BTeV Project Overview	J. Butler
10:00 AM	Performance Management System Overview Specifics on Schedule Specifics on Earned Value Specifics on Change Control	M. Lindgren B. Freeman E. Arroyo/S. Pasek M. Lindgren
Noon	Lunch/Committee Session – <b>Hornet's Nest</b> <b>Non-Committee Participants Lunch on 2<sup>nd</sup> Floor</b>	
1:00 PM	Q & A / Discussion of PMS Overview Presentation	
2:00 PM	Discussions with Individual WBS System Manager <ul style="list-style-type: none"> <li>○ Project Manager</li> <li>○ 1.2 Pixel</li> <li>○ 2.0 IR</li> <li>○ 3.0 C0 Outfitting</li> </ul>	M. Lindgren S. Kwan M. Church S. Dixon
4:00 PM	Committee Executive Session	

Wednesday, August 11, 2004 - Comitium

8:30 AM	Follow-Up as Needed
10:00 AM	Write Report
Noon	Lunch/Committee Executive Session
1:30 PM	Dry Run of Closeout
2:30 PM	Finalize Closeout Report
4:30 PM	Closeout-Summary with BTeV & Fermi Management – <b>Hornet's Nest</b>

## Appendix E

### Internal BTeV Performance Management System Review August 10-11, 2004

#### Review Committee

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## Tentative Reviewer Assignments for Internal BTeV Performance Management System Review

### BTeV PMS Review Report

Conduct Review as a “Committee of the Whole.” Each person comment on all areas, as they feel appropriate. Certain individuals responsible for writing report.

### Focus Areas for the Written Report

Executive Summary (Bock / Temple)

**1.0** Introduction (Temple/Hoffer)

**2.0** Management (Bock / Plunkett / Temple)

Scope Definition

Change Control

**3.0** Schedule (Clark / Plunkett/Hoffer)

Schedule

Resource Loading and Leveling

Basis of Estimate

WBS Dictionary

**4.0** Earned Value (Trimby / Nestander / Hoffer)

Coupling to Schedule

Coupling to Laboratory Accounting System

**5.0** Answer six questions in Lutha Draft Charge plus Does the BTeV PMS meet the 32 criteria of ANSI / EIA 748?

	Category	Subject Areas	Person(s) Responsible
<b>5.1</b>	1	System Operating and Reports	<u>Nestander</u> / Clark
<b>5.2</b>	2	Adequately Documented	<u>Clark</u> / Nestander
<b>5.3</b>	3	Timely and Accurate Reports	Plunkett
<b>5.4</b>	4	Flexibility to adapt to changes	<u>Hoffer</u> / Plunkett
<b>5.5</b>	5	Satisfy Fermilab and DOE needs	<u>Trimby</u> / Bock
<b>5.6</b>	6	Personnel knowledge to operate & use system	<u>Bock</u> / Nestander
<b>5.7</b>	7	ANSI / EIA 748	<u>Temple</u> / Hoffer

**Attachment** - 32 Item Table with additional column containing PMS Reviewers' Comments

Category	Subject Areas	Person(s) Responsible
1	Organization	<u>Temple</u> / Bock
2	Planning and Budgeting	<u>Clark</u> / Hoffer
3	Accounting Considerations	<u>Nestander</u> / Clark
4	Analysis and Management Reports	<u>Bock</u> / Plunkett
5	Revisions and Data Maintenance	Trimby

## **Appendix F**

### **Internal BTeV Performance Management System Review August 10-11, 2004**

#### **Review Participants**

##### **Review Committee**

G. Bock, (Chair)  
F. Clark  
D. Hoffer  
A. Nestander  
R. Plunkett  
E. Temple  
C. Trimby

##### **BTeV Presenters**

E. Arroyo  
J. Butler  
M. Church  
S. Dixon  
B. Freeman  
S. Kwan  
M. Lindgren  
S. Pasek

##### **Directorate**

J. Appel  
H. Montgomery  
K. Stanfield

##### **Department of Energy**

Ron Lutha  
Paul Philp

##### **BTeV Collaboration**

E. Barsotti  
C. Brown  
D. Christian  
R. Fast  
E. Gottshalk  
J. Howell  
P. Kasper  
Y. Kubota  
S. Stone  
M. Tomaz

## Appendix G

**Director's Review  
of  
BTeV's Performance Management System  
August 10-11, 2004**

### TABLE OF RECOMMENDATIONS

<b>No.</b>	<b>Responsible</b>	<b>Recommendation</b>	<b>Status</b>	<b>Date</b>
<b><i>2.0 Management</i></b>				
2.0.1		The project should define a regular cost and schedule overview and update process, to be performed at least annually.		
2.0.2		Verify consistency of all project management systems documents.		
<b><i>3.0 Schedule</i></b>				
3.0.1		Freeze the WBS and schedule on September 10 and implement the change control process for any subsequent changes. This will help minimize inconsistencies between Open Plan and Cobra during the Cobra implementation.		
3.0.2		Train project's financial manager so she gets up to speed quickly.		
3.0.3		The Labor Resource Leveling should be performed on the entire BTeV Open Plan schedule to better establish when the work not on the critical path will be performed based on availability of personnel. This will establish the appropriate schedule dates, which will be used for the schedule baseline and loaded into Cobra.		

3.0.4		As part of analyzing the monthly status updates to the schedule, a float analysis should be performed on key milestones and high-risk activities as an additional tool in the Performance Management System. The process for performing and reporting the float analysis should be established and then included in the PMSD.		
<b>4.0 Earned Value</b>				
4.0.1		Document the process that will be used to adapt the obligation budget profile to a cost budget profile then test and apply that process. Verify that the results are reasonable.		
4.0.2		Review and re-evaluate the PMT assignments and select a more objective method where appropriate.		
4.0.3		Decide on a project structure for reporting R&D costs across the laboratory and implement that structure in the Laboratory Accounting System early in FY05.		
4.0.4		Establish and document a process for entering in-kind contribution costs into Cobra.		
<b>5.0 Answer to Questions in DOE Draft Charge plus does the BTeV PMS meet the 32 criteria of ANSI / EIA-748-A?</b>				
5.0.1		Update the Earned Value Management System document (PMSD) to more accurately reflect how project management processes will be executed and verify that the content is consistent with other BTeV documents and Fermilab policies and procedures. Some of the processes that should be addressed in this update are: Generating earned value data based on late dates for submittal to DOE for PARS; Collecting monthly status, progress reports, and variance analyses; Generating the monthly report and Change control. (Question 5.2)		

5.0.2		Since application of the PMS has not yet begun, some group independent from the BTeV project should review how the system is working some six months or so into FY05. (Question 5.7)		
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